

THERMALLY-STABILIZED THERMAL BARRIER COATING AND PROCESS THEREFOR

Abstract

A thermal barrier coating (TBC 26) and method for forming the TBC (26) on a component (10) characterized by a stabilized microstructure that resists grain growth, sintering and pore coarsening or coalescence during high temperature excursions. The TBC (26) contains elemental carbon and/or a carbon-containing gas that increase the amount of porosity (32) initially within the TBC (26) and form additional fine closed porosity (32) within the TBC (26) during subsequent exposures to high temperatures. A first method involves incorporating elemental carbon precipitates by evaporation into the TBC microstructure. A second method is to directly incorporate an insoluble gas, such as a carbon-containing gas, into an as-deposited TBC (26) and then partially sinter the TBC (26) to entrap the gas and produce fine stable porosity within the TBC (26).